

# DIGITAL AUDIO PLAYER

m250/m500



## User Guide

 **MOTOROLA**

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### Federal Communications Commission (FCC)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Declaration of Conformity

According to 47 CFR, Parts 2 and 15 for Class B Personal Computers and Peripherals; and/or CPU Boards and Power Supplies used with Class B Personal Computers, Motorola, Inc., (Motorola, Inc., Broadband Communications Sector, 101 Tournament Drive, Horsham, PA 19044, 1-877-466-8646), declares under sole responsibility that the product identifies with 47 CFR Part 2 and 15 of the FCC Rules as a Class B digital device. Each product marketed is identical to the representative unit tested and found to be compliant with the standards. Records maintained continue to reflect the equipment being produced can be expected to be within the variation accepted, due to quantity production and testing on a statistical basis as required by 47 CFR 2.909. Operation is subject to the following condition: This device must accept any interference received, including interference that may cause undesired operation. The above named party is responsible for ensuring that the equipment complies with the standards of 47 CFR, Paragraphs 15.107 to 15.109.

## Industry Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.



## Safety

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### WARNING

TO REDUCE THE CHANCE OF SHOCK OR INJURY, DO NOT USE or OPERATE THIS DEVICE IN OR NEAR WATER OR WET LOCATIONS.

### CAUTION

RISK OF EXPLOSION, DAMAGE OR BATTERY LEAKAGE IS POSSIBLE IF BATTERY IS REPLACED INCORRECTLY OR BY AN INCORRECT TYPE. NEVER ATTEMPT TO CHARGE A NON-RECHARGEABLE ALKALINE BATTERY. DISPOSE OF USED BATTERIES ACCORDING TO INSTRUCTIONS OR LOCAL LAWS.

Use of headphones while operating a vehicle is not recommended and is unlawful in some states and areas. Be careful and attentive while driving. Stop operation of the player if you find it disruptive or distracting while operating any type of equipment. Listening to music at full power over extended periods of time can be damaging to the hearing of the user.

### BATTERY SAFETY INSTRUCTIONS

Do not burn, disassemble, mutilate, or puncture the battery. The battery contains toxic materials that could be released, resulting in injury.

Caution: There is a risk of explosion if you replace the battery with an incorrect battery type. Use only the battery that came with your player or an authorized replacement recommended by the manufacturer.

Keep batteries out of the reach of children.

Remove batteries if storing over 30 days.

Do not dispose of batteries in fire, which could result in explosion.

The rechargeable batteries that power this product must be disposed of properly and may need to be recycled. Refer to your battery's label for battery type. Contact your local recycling center for proper disposal methods.



## Contents

<b>Package Contents 6</b>	<b>Settings 39</b>
<b>Welcome 7</b>	<b>About 52</b>
<b>Tour of the m250/m500 9</b>	<b>Bookmarks 51</b>
<b>LCD Overview 12</b>	<b>Frequently Asked Questions 53</b>
<b>Basic Setup 15</b>	<b>Glossary 56</b>
<b>Software Setup 18</b>	<b>Appendix A – The MP3 Format 59</b>
<b>Basic Operations 24</b>	<b>Appendix B – Menu Tree 61</b>
<b>Play Music 30</b>	<b>Limited Warranty and Software License 62</b>
<b>FM Tuner 34</b>	<b>Index 69</b>
<b>Advanced Features 37</b>	



## Package Contents

- m250/m500 Digital Audio Player
- Installation CD
- Earphones
- AC Adapter/Charger
- Belt Clip
- Mini USB Cable



## Welcome

Congratulations on your purchase of the Motorola m250/m500 Digital Audio Player (Models DAP102/DAP105). The m250/m500 is a portable player that provides many hours of [MP3](#) and [WMA](#) playback, and features a lighted LCD, a stopwatch, and an FM radio tuner. Small and powerful, the m250 internal memory can store about 625 songs on its 2.5-gigabyte (GB) hard drive<sup>1</sup> while the m500 internal memory can store about 1250 songs on its 5 GB hard drive<sup>1</sup> (based on a 4-minute song encoded as a 128 kbps MP3). Song files are transferred from the drive into the memory and then the drive turns off to save power, provide skip protection, and ensure uninterrupted music play. The player is controlled by a small joystick on the front called the Thumbstick, so that most functions can be performed with one hand.

Included with the m250/m500 is the [Motorola Digital Music Center](#) for Windows® PCs. This easy-to-use and powerful software enables you to extract music tracks from CDs, organize them in a variety of ways, and quickly download them to the m250/m500 using a high-speed USB 2.0 connection. (Your computer must support USB 2.0 for the fastest transfer times; the m250/m500 and software will also work with the older USB 1.0 format.) **Help** files are included in your Motorola Digital Music Center that guide you step-by-step through the functions of the software and your player. Just click on the  icon and choose the topic for which you need information.

Additionally, the m250/m500 player's internal memory can be used as another storage device and is displayed on Windows Explorer as a removable drive when attached through the USB port.

The m250/m500 also supports Apple [iTunes](#)® software (a free download from [www.apple.com](http://www.apple.com)), and the firmware in the player accepts updates from both the PC and Macintosh® computers.

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<sup>1</sup> Actual formatted capacity is less. 1 GB = 1,000,000,000 bytes.



The m250/m500 supports the following digital audio formats:

- [MP3](#) with ID3 tags
- [WMA](#) with ID3 tags
- Audible® (spoken word) files (formats 2 and 3)
- Microsoft's DRM (Digital Rights Management) coding

The m250/m500 can play most [VBR](#) (Variable Bit Rate) files, although not all LCD features may be available for those tracks. The total number of songs that can be stored on the m250/m500 depends on the way in which they are encoded and the bit rate used. See the [FAQ](#) section of this manual for more information.

## **Learning More**

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The capabilities of the m250/m500, as well as the power of the software and the ways in which you can work with music files in general, are considerable. You will enjoy experimenting with the software and music files as you get to know how to get the most from your m250/m500 Digital Audio Player. Refer to the *Quick Start Guide* for the basics on how to set up and start using the m250/m500.



## Tour of the m250/m500

### Earphone Jack

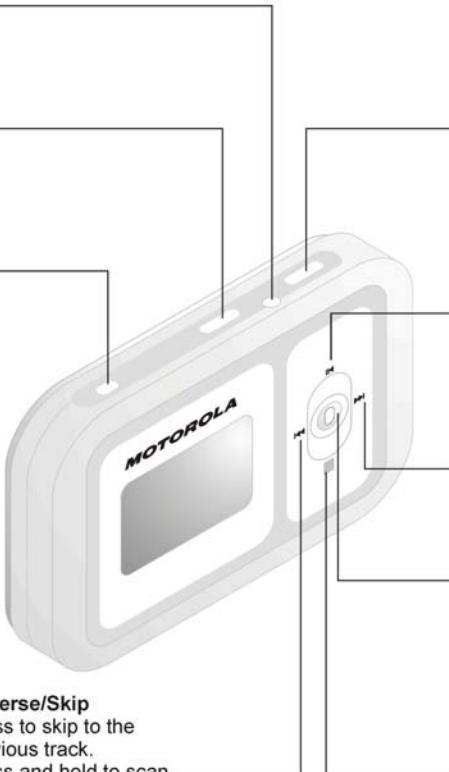
Connects to supplied earphones.

### Lock/Unlock

Slide into the LOCK position to disable buttons and prevent accidental operation.

### Power

Press to turn the player on.  
Press and hold to turn the player off.



## Main View

### Volume ±

Press to adjust volume level.

### Play/Pause

Press to play or pause playback.  
In Menu mode, press to scroll up through choices.

### Forward/Skip

Press to skip to the next track.  
Press and hold to scan forward.

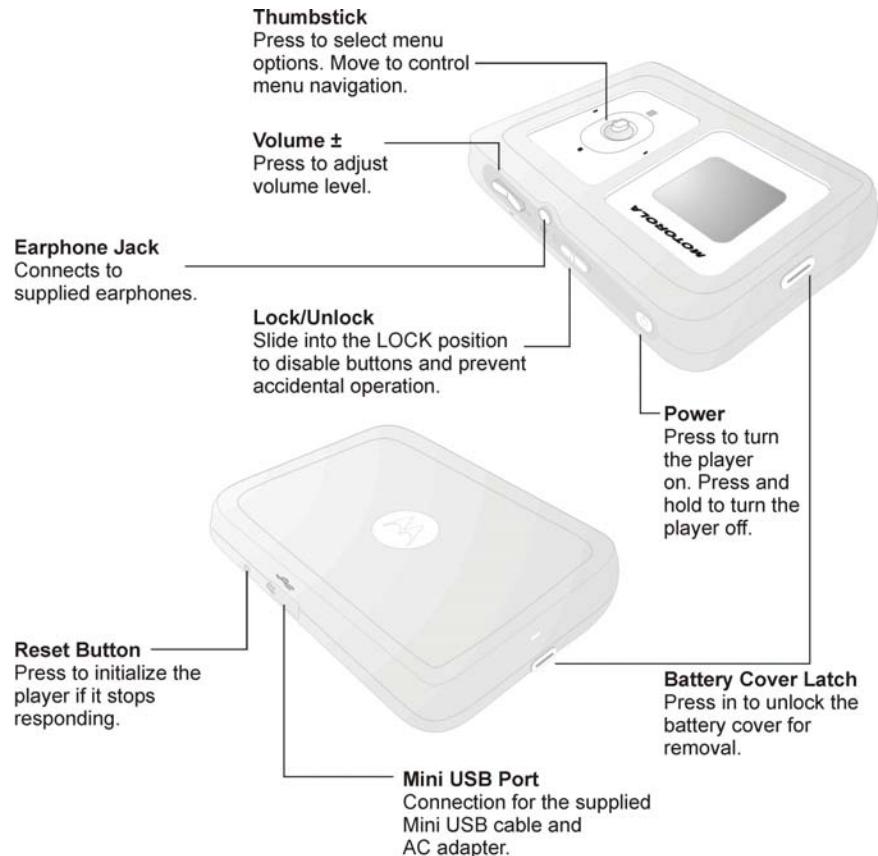
### Thumbstick

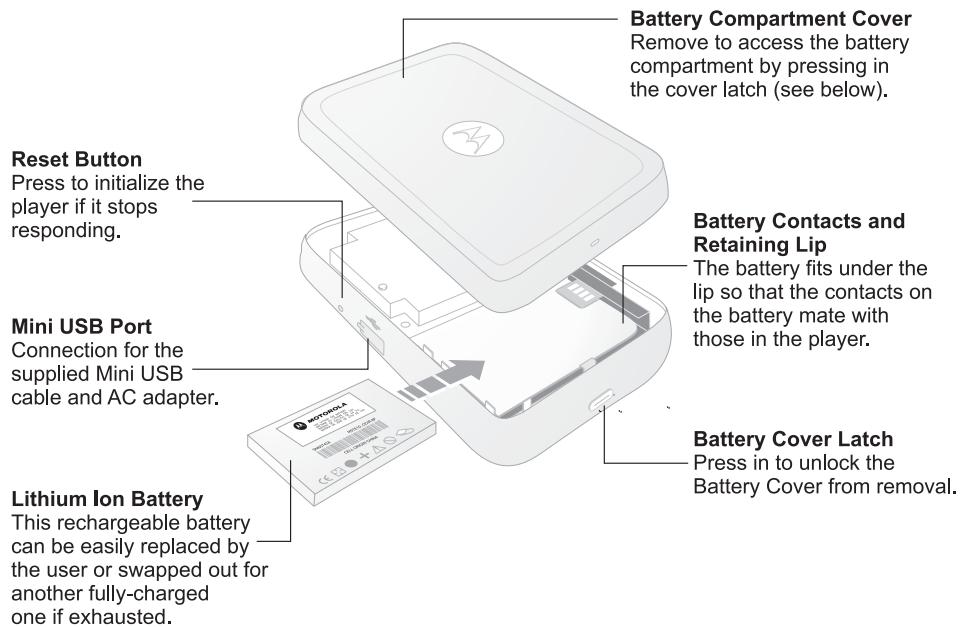
Press to select menu options. Move to control menu navigation.

### Menu

Press and release quickly to enter Menu mode.  
In Menu mode, press to scroll down through choices.



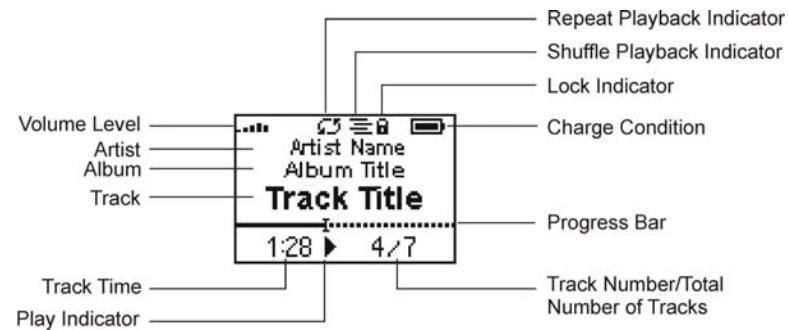




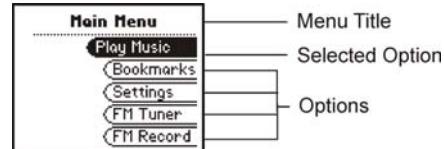
## Inside View



### Playback Mode



### Menu Mode



## Play Screens

Press the Thumstick to cycle through Date View, Time Code View, and Track Format View screens.

### Date View



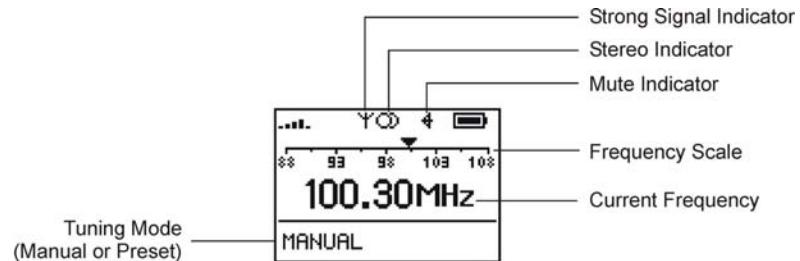
### Time Code View



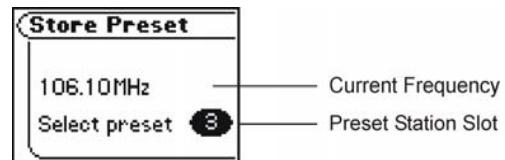
### Track Format View



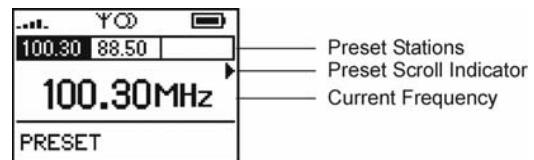
## FM Radio Manual



## FM Radio Store Preset



## FM Radio Preset



## Basic Setup

### Connections

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Before you can start using your new m250/m500 player, you'll have to install and connect a few things. This chapter describes how to attach the battery charger and connect the earphones and the Mini USB cable to the player.

#### AC Power Adapter/Charger

The AC adapter uses a Mini USB connector and attaches to the m250/m500 through the USB port. The first time you charge the battery, let it charge overnight.

- 1 Connect the AC adapter to the m250/m500 at the USB port.
- 2 Plug the AC adapter into an electrical outlet. The battery icon will appear in the upper right corner of the LCD and show itself filling up while charging.
- 3 When the battery is fully charged, the battery icon in the upper right corner will change to an electrical plug icon. Unplug the AC adapter and disconnect it from the player. Additionally, if the player is turned off while charging (player turns itself on when the charger is attached) a large “battery filling” icon appears in the center of the display, which changes to a large electrical plug when fully charged.

#### Battery

The m250/m500 uses a Motorola lithium-ion (Li-ion) replaceable battery that provides many hours of use. It is designed to be recharged in the player, but can easily be replaced if it wears out. You can buy extra batteries, charge them in the player, and then remove and keep them handy to extend the time you use the player away from an electrical source. The [battery compartment cover](#) must be removed before a battery can be removed or installed. To remove the cover:



- 1 Press in the small latch while lifting off the back cover of the player. (See the pictures on pages [10](#) and [11](#).)
- 2 Note that one end of the battery fits under a small metal lip and the other end is held in by small plastic clips. Lift the battery up from the latter end and slide it out from under the lip. The power contacts are underneath.
- 3 Install a new battery so that the end with the metal contacts will slide under the metal lip, and then snap the other end into place against the plastic clips.
- 4 Snap the cover back on. Make sure it's lined up properly with the slots in the player body.

## Earphones

Connect the supplied earphones to the earphone jack on the top of the player (see page [10](#)). Any quality audio earphones with a 3.5mm stereo plug can be used with the m250/m500; however, DO NOT use an earphone from a cell or cordless phone because the wiring is different and can damage the player.

## USB Cable

The m250/m500 communicates with your computer over a Mini USB cable using USB 2.0 protocols, with a transfer rate of up to 480 Mbps. The player must be connected using the included USB cable to the USB port on your computer to transfer music or files to and from the player and your computer. The Mini USB connector plugs into the port on the bottom of the player (see pages [10](#) and [11](#)). The port is covered by a soft plastic plug attached to the player. Use care in opening it and do not pull too hard on the plug.

Whenever you plug the player into the cable while the computer is on, the player turns on and establishes a link with the computer. You can then use your music software or file manager to transfer songs and data to and from the player.

When you are done, be sure to stop the link to the player to avoid corrupting files. In Windows, an icon is displayed on the taskbar like the one shown below. Click on it and a dialog box will appear asking you which device you want to stop. Click on the line for USB Mass Storage Device that has a removable drive listed below it, because that is how the player appears to Windows. For a Mac, follow the procedures specified by your operating system to stop or eject a USB device.



## USB Charging

When connected to a USB port, the computer can supply the power to run the player and charge its battery. This also allows you to listen to music from the player while it is connected to your computer without draining the battery.

## Additional Accessories

Get the most out of your m250/m500 with additional accessories that can make the player easier and more flexible to use. Shop the Motorola web site at <http://www.motorola.com/mp3players>.



## Software Setup

### Overview

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To enable your computer to work most effectively with the m250/m500 and access the full potential of the player, the appropriate software for your computer's operating system must be installed:

- [Motorola Digital Music Center](#) must be installed on computers that use the [Windows](#) operating system. Motorola Digital Music Center is the provided program you use in Windows to manage your audio files.
- [iTunes](#) must be installed on computers that use the [Macintosh](#) operating system.
- [Gracenote® CDDC© Music Recognition Service](#) is a free service you can register with that automatically provides details of audio CDs such as Title, Artist, and Track names.



## Windows

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Follow these instructions to load the installation software, which enables your PC to recognize the m250/m500. The installation also loads the [Motorola Digital Music Center](#). If you are using Windows 98 Second Edition, you may have to install drivers for the player from the CD; refer to your system documentation and Help files for details on doing this. You can also click on the **Add New Hardware** icon in Control Panel and follow the prompts.

- 1 Place the installation CD label-side up into your computer's CD-ROM drive. The installation software should launch automatically.



*If the installation software does not launch automatically, follow these steps to start installing manually:*

- a. Double-click the **My Computer** icon on the Windows Desktop.
- b. Double-click the **CD-ROM** icon.
- c. Double-click the **Install** icon.

- 2 Click **Motorola Digital Music Center Software and Drivers** and follow the on-screen instructions.
- 3 If prompted, reboot the computer when the installation is complete.



## USB

To transfer music or files between your computer and the m250/m500, connect the player to your computer using the supplied Mini USB cable.

### USB Detection with the Windows Device Driver

USB connectivity is ready to work immediately after Motorola Digital Music Center has been installed.

If for any reason the Windows Device Driver Wizard is displayed after the USB cable has been plugged into both the m250/m500 and the computer, please follow these steps:

- 1 Confirm that the installation CD is in the computer's CD-ROM drive.
- 2 Check the **CD-ROM Drives** box when the Device Driver Wizard requests the location of the m250/m500 drivers.
- 3 Click **Next** and follow the Device Driver Wizard instructions.



## Motorola Digital Music Center

Motorola Digital Music Center is an all-in-one solution that is simple to use and can save and manage entire collections of digital audio tracks. Motorola Digital Music Center provides the capabilities listed below.

- Copy ([rip](#)) audio CDs into compressed ([encoded](#)) digital audio formats. Motorola Digital Music Center encodes [WMA](#) files by default and [MP3](#) via an optional upgrade pack.
- Automatically [synchronize](#) the music collection on your computer with your m250/m500.
- Edit [ID3 Tag](#) and [WMA](#) tags on digital audio tracks.
- Organize and manage digital audio tracks on your computer and the m250/m500.
- Search for tracks on your computer and the m250/m500.
- Create custom playlists.
- Transfer tracks from your computer to the m250/m500.



## Macintosh

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### iTunes

*The iTunes plug-in is required for the Mac Operating System, 10.3 or higher.*

Your m250/m500 audio player is compatible with Apple's iTunes, which runs under the Macintosh operating system and is free and available at [www.apple.com](http://www.apple.com). Support for iTunes also can be found there and in the Help files of the program. iTunes offers the following features:

- Copy (rip) your audio CDs into compressed (encoded) digital formats, including MP3s.
- Organize digital audio tracks on your computer.
- Search for tracks on your computer.
- Create custom CDs.



*The m250/m500 doesn't support the AAC codec used for music files obtained from the iTunes Music Store at this time. However, there are many quality music file format conversion programs available online for little or no cost.*

*The m250/m500 does not support iTunes playlists.*



## Gracenote CDDB® Music Recognition Service

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The Gracenote CDDB© Music Recognition Service can be used to automatically look up details of audio CDs such as Title, Artist, and Track names. There is no charge to register and use the service. You have the option during the installation of Motorola Digital Music Center to register with Gracenote, but if you do not, you can register later by following the instructions below. To register, your PC must be connected to the Internet. It must also be connected to the Internet when ripping CDs so that Gracenote can retrieve and provide the music details of the CD being ripped.

In Digital Music Center:

- 1 Click Tools.**
- 2 Click Options.**
- 3 Click Copy CD.**
- 4 Click Advanced.**
- 5 Click Register to register or re-register with the Gracenote CDDB Music Recognition Service.**
- 6 Click Next.**
- 7 Check the box that reads "I have read and agree to these Terms of Use."**
- 8 Click Finish.**
- 9 Click Done.**
- 10 Click OK.**



*If you have not registered with Gracenote, a ripped CD will have ID3 tag data of "Unknown Artist" and "Track X" (where X is the track number of the CD) both in the player's information screen and in Motorola Digital Music Center.*



## Basic Operations

The basic operations of the m250/m500 are divided into four areas:

- How to **Control** the player functions
- How to **Copy** songs from CDs and other sources to your computer
- How to **Transfer** songs to the m250/m500 from your computer
- How to **Play Songs** on the player



## Control

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The following controls on the m250/m500 let you access the player's functions:

- **POWER**

Press to turn the player on. To turn the player off, press and hold until the bar graph moves completely across the screen and **Saving Settings** is displayed.

- **LOCK/UNLOCK**

Slide into the **LOCK** position to disable Volume and the Thumbstick (except Play/Pause operation). This works when the player is on and off; when the player is turned off, a padlock appears on the LCD if you try to turn it on with **LOCK** engaged. See Settings for Lock options.

- **VOLUME + and -**

Press either side of the button to adjust the volume level.



- **Thumbstick**

Move, like a joystick, toward any of the four symbols discussed below, or press in like a button. In Playback mode, press in to cycle through the Play Screens. In Menu mode, move to select categories or options, and press in to make choices.

- **Play/Pause** ►||

Press to play or press again to pause playback, and to move up through menus and options.

- **MENU** ☰

Press and release quickly to enter Menu mode without stopping music playback. Press and hold to stop playback, and to move down through menus and options.

- **Forward** ►►|

Press and release quickly to skip to the next track. Press and hold to scan forward through a track. In Menu mode, press to move into a submenu. When setting options, press to confirm the choice and a checkmark will appear on the LCD.

- **Reverse** |◀◀

Press and release quickly to skip to the previous track. Select and hold to scan backward through a track. In Menu mode, press to return to the Playback mode screen or to back out of a submenu. When setting options, press to cancel the choice and an X will appear on the LCD.



## Copy

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### Copying Tracks with Motorola Digital Music Center

Copying tracks from audio CDs involves two steps commonly known as [ripping and encoding](#). Ripping and encoding refer to the process of ripping (copying) audio from a CD and encoding (saving) the audio content into a compressed digital audio format like MP3 or WMA.

- 1 Launch the Motorola Digital Music Center.
- 2 Insert an audio CD into your CD-ROM drive.
- 3 Click the CD-ROM icon on the Motorola Digital Music Center Device List. In a short time the music tracks on the CD will be read and listed in the Digital Music Center window.
- 4 Use any of the following techniques to select tracks:

Track Type	Technique
Single track	Left-click the track
Multiple tracks	Press <b>SHIFT+Click</b> or <b>CTRL+Click</b>
All tracks	Press <b>CTRL+A</b>
No tracks	Press <b>CTRL+N</b>
Every track except for the currently selected tracks	Select <b>Edit, Invert Selection</b>

- 5 Click  to begin copying the selected tracks to your computer.



## Transfer

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### Transferring Tracks with Motorola Digital Music Center

Transferring tracks from the PC to the m250/m500 with the Motorola Digital Music Center involves selecting tracks and then transferring them onto the player.

- 1 Launch the Motorola Digital Music Center.
- 2 Click **My Music** in the left frame to access tracks. Motorola Digital Music Center scans the computer's hard drives for digital audio files that are compatible with the m250/m500 player. Files are automatically categorized by album title and displayed in the Track List.
- 3 You can select tracks within a specific category: Albums, Artists, Genres, Songs, and Playlists. For example, if you wish to copy all tracks by a favorite artist onto the player, click the **Artists** tab and then use any of the techniques in Step 4 to select the desired tracks.
- 4 Use any of the following techniques to select tracks:

File type	Technique
Single track, album, or artist	Left-click the track, album, or artist
Multiple tracks, albums, and/or artists	Press <b>SHIFT+Click</b> or <b>CTRL+Click</b>
All tracks, albums, and artists	Press <b>CTRL+A</b>
No tracks, albums, or artists	Press <b>CTRL+N</b>
Every track except for the currently selected tracks	Select <b>Edit, Invert Selection</b>

- 5 Click  to begin transferring the selected tracks to your m250/m500.



## iTunes

This is the music management software developed by Apple Computer and is available from the Apple web site. Check your computer documentation to find out how to load it onto your Mac operating system.

- 1 Launch iTunes.
- 2 Connect the player to a USB port on the computer. The m250/m500 will turn on.
- 3 Click **Library** in the iTunes Source frame.
- 4 Select the tracks to transfer.
- 5 Drag and drop the selected tracks onto the **m250/m500 player** listing in the iTunes Source frame.



iTunes will only refresh the audio contents located on the m250/m500 player after all selected tracks have been transferred.



## Play Music

There are two types of music playback in the m250/m500:

- **Play Music** plays digital audio music tracks in Playback mode.
- **FM Tuner** will let the player receive FM radio stations.

These types of playback can be changed at any time through the Main Menu.



### Playback

In Playback mode (the default mode), any track or preset customized playlist can be played within seconds by selecting the appropriate category.

- **Play All** will play all songs on the m250/m500.
- **Album** will select the songs whose information identifies them as belonging to a particular CD album.
- **Artist** will identify songs from a particular artist for playback, based on track information.
- **Genre** will play all songs that match a particular type of music, based on track information.
- **Track** will play a specific track.
- **Year** will group and play songs that were published in a certain year.
- **New Music** will include and play songs that were added to your music lists within a specified recent period of time.
- **Playlists** will use the lists you have made of selected songs to play.
- **Spoken Word** is used to play AUD® (audible) files such as those used for recorded books.
- **FM Recordings** will open a list of recorded broadcasts for playing. These can be music, speeches, talk shows, etc.



## Play All

To play all tracks:

- 1 Open  **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Play Music**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Play All**.
- 5 Press Thumstick in to begin playback.

## Album

To play a specific album:

- 1 Open  **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Play Music**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Album**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select an album to play.
- 7 Press Thumstick in to begin playback.

Repeat these instructions to select any of the other Playback options (Artist, Genre, Track, Year, New Music).



## Playlists

To create a playlist accessible on your m250/m500:

- 1 Select your m250/m500 from the Device List in Motorola Digital Music Center.
- 2 Select tracks to add to a playlist.
- 3 Right-click a highlighted track.
- 4 Click **Add** to playlist.
- 5 Click **New Playlist**.
- 6 Enter a playlist name.
- 7 Click **OK**.

To start a playlist:

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Play Music**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Playlists**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select a playlist.
- 7 Press Thumstick in to begin playback.

## Spoken Word

To play spoken word tracks:

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Play Music**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Spoken Word**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select a title or file.



## FM Record

To play tracks recorded from the FM tuner:

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **FM Record**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Playback**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select a recording or to **Play All**.
- 7 Press Thumstick in to begin playback.

To delete tracks recorded from the FM tuner:

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **FM Record\***.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Delete**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select a recording or to **Delete All**.
- 7 Press Thumstick in to remove the selection(s).

*\*FM Record appears in the menu as FM Record and in the immediate submenu as FM Recording.*



## FM Tuner

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The FM Tuner is a stereo FM receiver with the capability of storing up to eight preset stations and recording broadcasts into the player's memory. When using the FM Tuner, there are three different modes of operation:

- **Manual** allows you to tune in a station by moving **Thumbstick** forward (▶▶) or backward (◀◀).
- **Store Preset** lets you set a station frequency under a memory location, like a car radio push button.
- **Preset** recalls the stored stations so they can be tuned in by pressing on a number.

## FM Control

When in FM Tuner mode, the following controls function differently depending on the mode:

- **MENU (☰)**  
Press to enter Menu mode.
- **Play/Pause (▶||)**  
Press to mute the FM radio. Press and hold to start and stop FM Record.
- **Forward (▶▶) and Reverse (◀◀)**  
In Manual mode, press to tune up or down the frequency range. Press and hold to search up or down the frequency range for particularly strong signals.
- **Thumbstick (Movement)**  
Move to duplicate the **Play/Pause (▶||)**, **Forward (▶▶)**, and **Reverse (◀◀)** functions listed above. Press and hold **Play/Pause (▶||)** to start and stop FM Record. Press in to enter Preset mode. In Manual mode, press and hold to enter Store Preset mode.



## Manual

To enter the FM Tuner mode and use manual tuning:

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **FM Tuner**.
- 3 Press Thumstick in.
- 4 Press Thumstick quickly to  to switch between the auto-searching option and no searching. (Autosearch looks for the next strong signal when Thumstick is pressed to **Forward** () or **Reverse** ()).

## Store Preset

The m250/m500 allows programming of up to eight FM preset slots. To store a preset:

- 1 When in Manual mode, tune to a frequency you wish to store.
- 2 Press and hold Thumstick to enter Store Preset mode.
- 3 Press Thumstick toward **Forward** () or **Reverse** () to cycle to the desired preset station slot.
- 4 Press Thumstick to store the frequency to the selected FM preset slot. After a frequency has been stored to a slot the player will enter Preset mode.



## Preset

To access an FM preset slot:

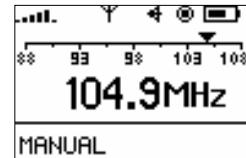
- 1 When in Manual mode, press Thumstick in to enter **Preset** mode.
- 2 Press **Forward (▶▶)** or **Reverse (◀◀)** to cycle to the desired preset station.
- 3 Press Thumstick in to select a preset station and return to Manual mode.



## Recording Broadcasts

The m250/m500 FM Tuner allows you to record FM broadcasts and play them back through the player. To record a broadcast:

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **FM Tuner**.
- 3 Press Thumstick in.
- 4 Press Thumstick quickly to  to switch between the auto-searching option and no searching. (Autosearch looks for the next strong signal when Thumstick is pressed to **Forward (▶▶)** or **Reverse (◀◀)**).
- 5 Move Thumstick up for about 1 second.
- 6 The record icon will appear at the top of the display screen after several seconds.
- 7 To stop the recording, press the Thumstick up for about 1 second again.
- 8 The record icon will disappear after several seconds.



## Advanced Features

Your m250/m500 offers a number of useful advanced features beyond the playing of music:

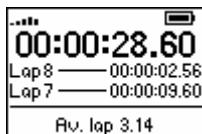
- **Stopwatch** Use this feature to record thousands of laps and instantly tell how much faster or slower the last lap was when compared to the previous one.
- **Settings** The **Settings** menu lets you adjust basic m250/m500 configurations, such as the LCD backlight, power saving, etc.
- **Bookmarks** You can use **Bookmarks** to keep both a place in a recorded book and to save your own personal settings if you share the player with someone else, who can also store their own settings using bookmarks.
- **About** The **About** menu holds information about the firmware version in the m250/m500 and the storage space remaining on the hard drive.



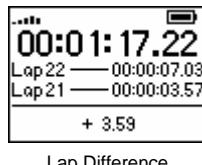
## Stopwatch

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You can use the stopwatch to keep track of time-related events while listening to music.



Average Lap Time



- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Stopwatch**.
- 3 Press Thumstick in.

Lap statistics are displayed at the bottom of the Stopwatch screen. When a new lap is set, the difference, either faster (- for time removed) or slower (+ for time added), between the new lap time and the current average laptime is displayed for a few moments, and then the new current average laptime is displayed. The time for the two most recent laps is shown below the counter, and each new lap saved erases the one before the last. The m250/m500 can track thousands of laps.

When in Stopwatch mode, the controls work in the ways described below.

- 1 Press Thumstick toward  to return to the Main Menu.



*Returning to the Main Menu and using other player functions will not turn the stopwatch off. The timer continues to run until the Thumstick is pressed up (Play/Pause or  while Stopwatch is shown on the LCD. The timer also holds a paused time until either it is reset to zero or the player is turned off.*

- 2 Press Thumstick in to set a lap time. Press and hold to return to the single lap display. Multiple laps and lap averages will be lost.
- 3 Press Thumstick up toward  to start and stop the timer.
- 4 Press Thumstick down toward  to enter Menu mode. Press and hold to reset the stopwatch timer.



## Settings

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The Settings selection is used to configure certain characteristics of the m250/m500, such as the sound equalizer or the backlight of the LCD. These settings include:

- **Playback** setting lets you choose from regular, shuffled, or repeating.
- **Equalizer** allows you to adjust the player sound using various preset and fully customizable equalizer options.
- **Power** settings are used to adjust the power-saving timeout length.
- **Resume** options are used to set the track that the m250/m500 will play whenever the unit is restarted.
- **Display** allows you to adjust backlight and contrast settings.
- **Time** allows you to set the player's internal clock.
- **FM Tuner** allows you to choose whether to turn off stereo FM (for better reception) and the tuning method.
- **Lock setting** lets you choose which controls are affected by the **LOCK** switch.
- **Tags** gives you the option of changing the kinds of tags used for music files.



## Playback

Various playback settings can be set to modify the way the m250/m500 plays tracks. Tracks can be shuffled at random and/or repeated continuously.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Playback**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select between **Shuffle** and **Repeat** options and press **Forward** () and **Reverse** () to select options within Shuffle and Repeat.
- 7 When the options are set as you want, press Thumstick in.
- 8 Press **Forward** () to save settings and **Reverse** () to cancel them.

Playback options include:

- **Shuffle**  
Set selected tracks to play in standard or random order. Settings include **Off** (the default setting) and **On**.
- **Repeat**  
Set to repeat playback of all tracks or the current track. Settings include **Off** (the default setting), **All**, and **One**.



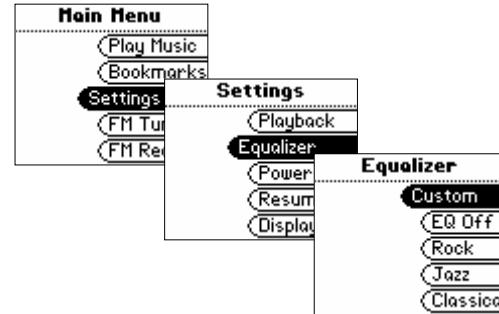
## Equalizer

The sound of tracks played on the m250/m500 can be adjusted using various preset and fully customizable equalizer options. Equalizer settings include:

### Custom

Custom mode allows the player's settings to be adjusted according to personal preferences.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Equalizer**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select **Custom**.
- 7 Press Thumstick in.
- 8 Adjust the 5-band equalizer. Press **Forward** () and **Reverse** () to navigate between frequencies. Press **Play/Pause** () or **MENU** () to boost or cut the **gain** of the frequency.
- 9 When the equalizer is set, press Thumstick in.
- 10 Press **Forward** () to save settings or **Reverse** () to cancel them.



## EQ Off

Select the **EQ Off** option to apply no equalizer adjustments to audio content on the m250/m500. This is also known as using “flat” settings.

- 1 Open **MENU** by pressing Thumbstick to .
- 2 Move Thumbstick to select **Settings**.
- 3 Press Thumbstick in.
- 4 Move Thumbstick to select **Equalizer**.
- 5 Press Thumbstick in.
- 6 Move Thumbstick to select **EQ Off**.
- 7 Press Thumbstick in to set the **EQ Off** option and return to Playback mode.

## Rock

Select the **Rock** equalizer option to change the sound of tracks according to the **Rock** preset settings.

- 1 Open **MENU** by pressing Thumbstick to .
- 2 Move Thumbstick to select **Settings**.
- 3 Press Thumbstick in.
- 4 Move Thumbstick to select **Equalizer**.
- 5 Press Thumbstick in.
- 6 Move Thumbstick to select **Rock**.
- 7 Press Thumbstick in to set the **Rock** option and return to Playback mode.

Repeat these instructions to select any of the other Equalizer presets (Jazz, Classical, Pop, Trance).



## Power

To conserve energy and extend the amount of playback time during each battery charge, set the player to shut down after being idle for a specific number of minutes. Settings include **1m**, **5m** (the default setting), **10m**, **30m**, and **Never**.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Power**.
- 5 Press Thumstick in.
- 6 Move Thumstick **Forward** (▶▶) and **Reverse** (◀◀) to select **Power** options.
- 7 When the options are set as you want, press Thumstick in.
- 8 Press **Forward** (▶▶) to save settings and **Reverse** (◀◀) to cancel them.



### ⇒ Power-saving tips:

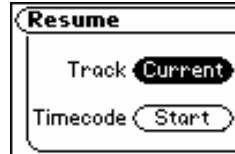
- **EQ settings** — With EQ settings OFF, the battery will last longer.
- **Contrast** — Turn down the contrast as low as possible.
- **Backlight** — Don't set the backlight for the display to be always on. Try turning it off completely, or setting it to two seconds.
- **Volume** — Higher volumes draw more power. The rating for your player was determined using a volume of 15.
- **Bitrate** — Higher bitrates draw more power than lower ones. Try ripping at 128 kbps.
- **Audio format** — WMAs use more processing power than MP3s.
- **Standard headphones** — High-powered headphones use more power. Test the battery life with the standard ear buds or headphones that are included with your player.



## Resume

Use the options in the Resume menu to set the track that the m250/m500 will play whenever the unit is restarted.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Resume**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select between Track and Timecode options and **Forward (▶▶)** and **Reverse (◀◀)** to select options within Track and Timecode.
- 7 When the options are set as you want, press Thumstick in.
- 8 Press **Forward (▶▶)** to save settings and **Reverse (◀◀)** to cancel them.



**Resume** options include:

- **Track**  
Set the player to begin playback of the last track played before shutdown or the first track in the running order when the player restarts. Settings include **Current** (the default setting) and **First**.
- **Timecode**  
Set the m250/m500 to begin playback of the last track played either at the point in the track when shutdown occurred or at the start of the track. Settings include **Current** (the default setting) and **Start**.



## Display

Use the Display menu to adjust backlight and contrast settings.

- 1 Open  **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Display**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select between **Backlight** and **Contrast** options and **Forward (▶▶)** and **Reverse (◀◀)** to select options within Backlight and Contrast.
- 7 Press **Forward (▶▶)** or **Reverse (◀◀)** to set how long the backlight will stay lit.
- 8 If you want to change the screen contrast, press Thumstick down.
- 9 Press **Forward (▶▶)** to increase and **Reverse (◀◀)** to decrease contrast.
- 10 When the options are set as you want, press Thumstick in.
- 11 Press **Forward (▶▶)** to save settings and **Reverse (◀◀)** to cancel them.



## Display options include:

- **Backlight**

Set the backlight on the player to shut itself off after a specific number of seconds. Settings include **Off**, **2s**, **5s** (the default setting), **10s**, **20s**, and **On**. **Off** disables the backlight and **On** sets the backlight to remain lit constantly.



*To conserve battery life, the **On** setting should rarely be used. See other power-saving tips [here](#).*

- **Contrast**

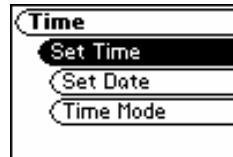
Move the Thumbstick to control the contrast slider. The contrast slider sets how light or dark the images on the LCD will appear. Setting the contrast too high will result in washed-out images. Setting the contrast too low will result in images that are too dark to read.



## Time

Use the options in the Time menu to set the player's internal clock.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Time**.
- 5 Press Thumstick in.
- 6 Move Thumstick to select between **Set Time**, **Set Date**, or **Time Mode** options and **Forward** ( ) and **Reverse** ( ) to select options within Set Time, Set Date, or Time Mode.
- 7 Press Thumstick to apply settings and return to Playback mode.



Time settings include:

- **Set Time**  
Options include **Hour**, **Minute**, and **AM/PM**.
- **Set Date**  
Options include **Month**, **Day**, and **Year**.
- **Time/Date Mode**  
Options include **12-hour** (the default setting) and **24-hour** time formats and **USA** (the default setting), **Europe**, and **Japan** date formats.



## FM Tuner

Use the options in the FM Tuner menu to control the player's FM setup.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **FM Tuner**.
- 5 Press Thumstick in. The **Options** bar will be highlighted; press Thumstick in again.
- 6 The **Stereo** and **Region** options will appear with the current modes displayed and the **Stereo** setting blinking.
- 7 Press Thumstick either **Forward** ( ) or **Reverse** ( ) to change the **Stereo** option, then press Thumstick down to select the **Region** setting, which will start blinking.
- 8 Press Thumstick either **Forward** ( ) or **Reverse** ( ) to change the option to the area where you will be using the m250/m500. Press Thumstick in to set that option, which will stop blinking.
- 9 Press **Forward** ( ) to save settings and **Reverse** ( ) to cancel them. Either a check mark  (accepted) or an  (canceled) will appear on the screen. If accepted, you will return to the screen shown before you started this task; if canceled, you will see the **Options** bar screen again. Press **Reverse** ( ) to go back to the **Settings** menu.

**FM Tuner** options include:

- **FM Stereo Mode**

Options include **On** (the default setting) and **Off**. Selecting **Off** will place the tuner in mono mode. This may help eliminate any hiss heard on distant stations.

- **Region**

Options include **USA** (tunes by .2MHz, the default setting), **Japan** (tunes by .05 MHz), and **Europe** (tunes by .05MHz).



## Lock Setup

Use the options in the Lock Setup menu to enable volume and Thumbstick control when the lock is enabled.

- 1 Open **MENU** by pressing Thumbstick to .
- 2 Move Thumbstick to select **Settings**.
- 3 Press Thumbstick in.
- 4 Move Thumbstick to select **Lock Setup**.
- 5 Press Thumbstick in.
- 6 Move Thumbstick to select between **Lock Volume** and Thumbstick options and **Forward (▶▶)** and **Reverse (◀◀)** to select options within Lock Volume and Thumbstick.
- 7 When the options are set as you want, press Thumbstick in.
- 8 Press **Forward (▶▶)** to save settings and **Reverse (◀◀)** to cancel them.



**Lock Setup** settings include:

- **Lock Volume**  
Options include **On** (the default setting) and **Off**. When set to **Off**, the volume level can be adjusted even when the m250/m500 has been locked.
- **Thumbstick**  
Options include **Lock** and **▶/||** (Play/Pause). When set to **▶/||**, any Thumbstick movement will be interpreted as the **▶/||** control.



## Tags

Tags are used to store the properties information about a digital audio file (size, type, rate, etc.). This information is displayed at the bottom of the LCD during playback of each song; refer to the sample Play screens in Chapter 1.

Occasionally this information might not display properly, especially if a file was downloaded from a site outside of the region in which you normally use the player. You may find it necessary to change the tag setting in order to see this information. Changing a tag setting, however, may then cause other information to display improperly, so change tag settings only if necessary.

- 1 Open  **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Settings**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Tags**. A warning message will be displayed about changing tag formats.
- 5 Press Thumstick in.
- 6 Move Thumstick **Forward** (    

The tag formats available are **ASCII** (the most commonly used), **UTF-8**, and **JIS** (a Japanese format). Changing the tag will not affect the rest of the LCD display.



## Bookmarks

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Bookmarks are useful for marking a place in an audio book. They are also perfect for multiple users who share the same m250/m500. Bookmarks store specific player settings, including the current running order, the current track, the current time position of the track, the repeat setting, and the shuffle setting. Users can save these settings in a bookmark and restore them whenever they use the player.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **Bookmarks**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select a bookmark option.
- 5 Press Thumstick in.



**Bookmark** options include:

- **Select**  
Use Thumstick to select a bookmark. Press Thumstick to restore the selected bookmark settings.
- **Set**  
Press Thumstick to set a bookmark.
- **Delete**  
Use Thumstick to select a bookmark. Press Thumstick to delete the selected bookmark.



*The m250/m500 automatically saves the current user settings when it is turned off. These settings are automatically restored when the m250/m500 is turned back on. Settings saved automatically are not saved as bookmarks.*



## About

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The About screen displays information about the m250/m500, including the total amount of space on the disk, the amount of free space, the number of tracks on the player, and the [firmware](#) version.

- 1 Open **MENU** by pressing Thumstick to .
- 2 Move Thumstick to select **About**.
- 3 Press Thumstick in.
- 4 Move Thumstick to select **Player** or **Storage**.
- 5 Press Thumstick in.

**About** options include:

- **Player**  
Displays firmware version, copyright, and Motorola web site information.
- **Storage**  
Displays disk usage graphic bar, disk usage (MB used/MB capacity), and the total number of tracks.



## Frequently Asked Questions

The FAQs in this chapter will help you solve common issues with your player. If you do not find the answers you need here, you can contact our Customer Service Department using any of the following methods:

**Web:** <http://broadband.motorola.com/consumers/support/default.asp?SupportSection=DAP>

**Technical Support Telephone:** 1-877-466-8646

Question	Answer
What type of files can I play with the m250/m500?	You can play MP3 and WMA music files, and AUD (spoken word) files used for recorded books. Songs in other types of music source files can be played if first converted to these formats. Converters are widely available online.
Can I use MP3 and WMA files in the m250/m500 at the same time?	Yes. You can mix MP3 and WMA audio content.
What are the differences between MP3 and WMA files?	WMA files are generally half as large as comparable sounding MP3 files. Because WMA uses smaller file sizes, you can store more music in less space on CDs, hard drives, or the m250/m500. The WMA format is exclusive to Windows-based computers.
Will the m250/m500 play Variable Bit Rate (VBR) files?	Yes. Because there are many standards for VBR files, it cannot be guaranteed that every encoding software package will properly function with the m250/m500. VBR files that do not comply to standards may lack track time, fast forward, and/or rewind capabilities.



Question	Answer
What kind of battery can I use with the m250/m500?	The m250/m500 uses a Motorola lithium ion rechargeable replaceable phone battery. It is designed to be recharged in the player, and can be easily replaced if it wears out or if you want to keep extra charged batteries on hand.
Where is the battery indicator on my m250/m500?	The battery indicator on the m250/m500 is located in the top right corner of the display. The segments in the battery icon show the remaining battery power. The illumination of all segments indicates a fully charged battery. Non-illuminated segments indicate a run-down battery.
What kind of skip protection does the m250/m500 have?	<p>The m250/m500 reads the song data from the file stored on the hard drive into an internal memory, and then plays the song from that memory. Depending on the length of the music data (individual songs or a long playlist, etc.) the player will keep reading data from the hard drive, and when all required data have been read or the memory is full, the drive will spin down to save battery power and play only from memory.</p> <p>Since the memory uses no moving parts, there is nothing to affect the stream of sound. The drive itself is very sturdy and will not be damaged by small accidental bumps or knocks. However, dropping the player onto a hard surface while the drive is running may permanently damage the unit.</p>
Why won't the m250/m500 turn on?	The m250/m500 will not power on if <b>LOCK/UNLOCK</b> is in the locked position. If you press the <b>POWER</b> button, a padlock will appear on the LCD to remind you that the unit is locked. Confirm that the <b>LOCK/UNLOCK</b> switch is not in the locked position and press <b>POWER</b> to turn it on. If nothing happens after pressing the <b>POWER</b> button, the battery is probably discharged.



Question	Answer												
How much music can I store on the m250/m500?	<p>The amount of music that can be stored on the m250/m500 depends on the bit rate of the files stored.</p> <table> <thead> <tr> <th data-bbox="663 256 762 283">Bitrate</th> <th data-bbox="865 256 1430 303">Approximate amount of space required per minute of audio content</th> </tr> </thead> <tbody> <tr> <td data-bbox="663 337 762 364">64 kbps</td> <td data-bbox="865 337 964 364">0.5 MB</td> </tr> <tr> <td data-bbox="663 364 762 391">96 kbps</td> <td data-bbox="865 364 981 391">0.75 MB</td> </tr> <tr> <td data-bbox="663 391 762 417">128 kbps</td> <td data-bbox="865 391 964 417">1 MB</td> </tr> <tr> <td data-bbox="663 417 762 444">164 kbps</td> <td data-bbox="865 417 981 444">1.25 MB</td> </tr> <tr> <td data-bbox="663 444 762 471">192 kbps</td> <td data-bbox="865 444 981 471">1.75 MB</td> </tr> </tbody> </table>	Bitrate	Approximate amount of space required per minute of audio content	64 kbps	0.5 MB	96 kbps	0.75 MB	128 kbps	1 MB	164 kbps	1.25 MB	192 kbps	1.75 MB
Bitrate	Approximate amount of space required per minute of audio content												
64 kbps	0.5 MB												
96 kbps	0.75 MB												
128 kbps	1 MB												
164 kbps	1.25 MB												
192 kbps	1.75 MB												
Can I update the <b>firmware</b> on the m250/m500?	<p>Yes. If available, firmware for your m250/m500 can be downloaded from the Motorola web site:</p> <p><a href="http://broadband.motorola.com/consumers/support/default.asp?SupportSection=DAP">http://broadband.motorola.com/consumers/support/default.asp?SupportSection=DAP</a></p>												



## Glossary

### Bass

Bass is the particular low-range area of the sound spectrum where low musical notes and sounds are located. Increasing the bass value will make the low vocals and drums more prominent in your music. You can select the amount of bass in your music by selecting various [equalizer](#) options.

### Bitrate

Bitrate denotes the number of bits per second used by a digital music file. The size and quality of a compressed digital audio file are determined by the bitrate used when encoding the file. Generally, the higher the bitrate used, the higher the sound quality, and the larger the file size. For example, a bitrate of 96 kbps (96,000 bits per second) is generally thought of as “CD quality” for WMA audio files, and takes up about 0.75 MB-per-minute of music. At a 64 kbps bitrate, the sound quality of WMA is similar to that of an FM radio signal, but approximately two minutes of music will fit in 1 MB of space.

### Codec

Depending on the context and kind of technology involved, codec can be defined as a compressed digital audio file format (like MP3, WMA, etc.), a “coding/decoding” chip used to translate between digital and analog transmissions (used in modems), or a compression/decompression algorithm. Codecs compress audio data into a file, often for efficient transmission over a network, and then decode it for playback. While all the codecs perform similar compression of digital audio, there are differences in technologies.

The m250/m500 supports the following digital audio codecs: MP3 and WMA. The Advanced Audio Coding (AAC) Codec<sup>2</sup>, most closely identified with MPEG-4, is not currently supported by the m250/m500.

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<sup>2</sup> AAC was developed by the MPEG group that includes Dolby®, Fraunhofer ®(FhG), AT&T®, Sony®, and Nokia®—companies that have also been involved in the development of audio codecs such as MP3 and AC3 (also known as Dolby Digital). The AAC codec in QuickTime® 6 builds upon new, state-of-the art signal processing technology from Dolby Laboratories and brings true Variable Bit Rate (VBR) audio encoding to QuickTime.



## **Firmware**

Firmware is the read-only software that is installed on the player. Like software, it can be updated, but unlike software it can never be deleted from the player.

## **Gain**

Gain is a measurement of the amplitude of all frequency ranges. Gain adjustments boost or reduce frequencies to provide a more desirable audio output.

## **ID3 Tag**

The ID3 tag is the part of the encoded MP3 or WMA file that contains information about the digital music file such as song title, artist, album title, encoding bit rate, track time duration, and so on. ID3 tag information is displayed on the Album/Artist/Track title line on the player's LCD.

## **MP3**

MP3 is short for Moving Pictures Experts Group Audio Layer 3. MP3 is the most well-known compressed digital audio file format. This format allows for near "CD quality" sound, but at a fraction of the size of normal audio files. MP3 conversion of an audio track from CD-ROM can reduce the file size by approximately a 12:1 ratio with virtually no perceptible loss in quality. MP3 compression removes the redundant and irrelevant parts of a sound signal that the human ear doesn't hear. This digital sound encoding and compression process was developed by the Fraunhofer Institute for Integrated Circuits and Thomson Multimedia. See [Appendix A](#) for more information.

## **Rip and Encode**

Rip and encode refer to the process of extracting (copying, or ripping) audio from a music CD and encoding it into a compressed digital audio format like MP3 or WMA.

## **Synchronize**

Motorola Digital Music Center can automatically (or manually) delete old content, transfer new audio content, and keep the content on your m250/m500 fresh and dynamic. Motorola Digital Music Center must be open for synchronization to occur between your m250/m500 and your computer.



## **Treble**

Treble notes occupy the higher portion of the sound spectrum. Increasing the treble value will raise the levels of the high sounds in your music files. You can select the amount of treble in your music by selecting various [equalizer](#) options.

## **VBR**

Variable Bit Rate (VBR) encoding converts tracks at a variable rate, using higher bit rate encoding for complex portions and lower bitrate encoding for pauses in songs.

## **WMA**

Windows Media Audio (WMA) is a compressed audio format created by Microsoft as an alternative to MP3. The WMA codec offers greater file compression than the MP3 codec, enabling storage of more digital audio tracks in the same amount of space when compared to MP3s at the same level of quality.



## Appendix A – The MP3 Format

The MP3 format has vastly expanded the capabilities of music distribution. Able to compress digital sound to a fraction of the size of conventional WAV sound, MP3 lends itself ideally to Internet distribution, and to new listening device technologies. Your Motorola m250/m500 is a leading edge player able to take advantage of the incredible flexibility afforded by this format.

To understand how the MP3 format works, it is helpful to know something about how CDs store music. A CD stores a song as digital information. Data are stored on a CD-ROM in an uncompressed, high-resolution format that splits the sound into separate samples for the left and right speakers, thus creating stereo. Music is sampled 44,100 times per second, with each sample being 2 bytes (16 bits) long. A CD, then, stores a huge number of bits for each second of music:

$$44,100 \text{ samples/second} * 16 \text{ bits/sample} * 2 \text{ channels} = 1,411,200 \text{ bits per second}$$

Specifically, 1.4 million bits per second equals 176,000 bytes per second. If an average song is three minutes long, then the average song on a CD consumes about 3.2 MB of space. That limits the number of songs that can be carried on a small portable device and makes for burdensome download times, especially if you are not using high-speed Internet connections.

### Codec is the MP3 Fuel

The key to the compact nature of MP3 formatted music is compression. MP3 is actually a digital audio codec, which is a method of **compressing** and **decompressing** digitized sound. A standard CD audio format uses roughly 10 MB for just one minute of music. MP3 uses just 1 MB for that same minute of music.

The way that MP3 compresses data is essentially by removing those sounds deemed inaudible to the human ear. There are highs and lows in any sample that are beyond, or nearly beyond, our aural comprehension, and MP3 effectively eliminates them to produce the compact files necessary to provide the ease and flexibility the format delivers. While there is undeniably a loss of overall sound quality, it is generally “near CD” quality, and acceptable for portable listening. It is a compromise between high fidelity and the advantages of transferability and storage ease.

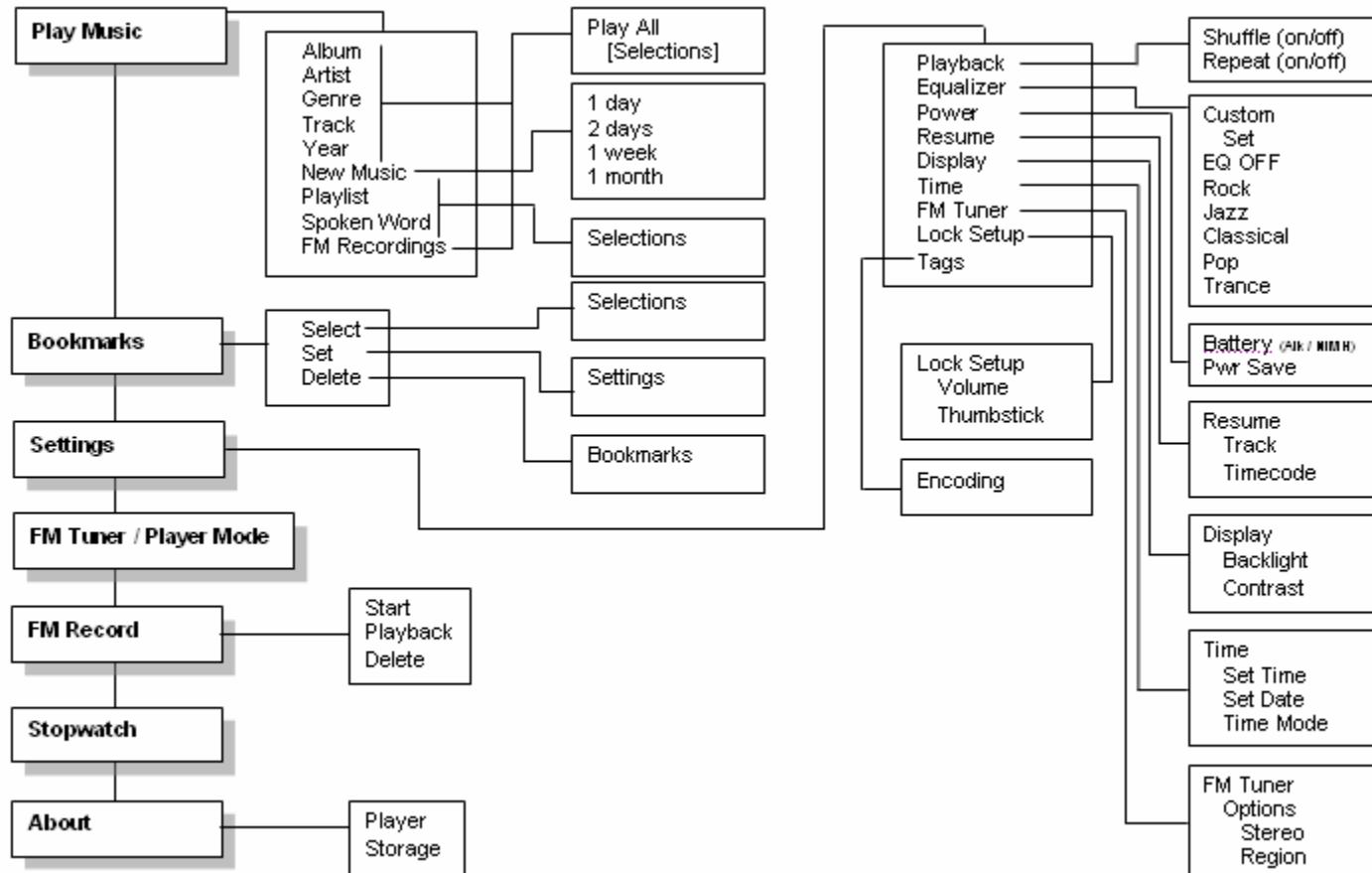


## Ripping and Encoding

One of the great features of a portable MP3 player like the Motorola m250/m500 is that it allows you to select the best of the music you own and download it to the player, creating your own “greatest hits” collections. Using a tool like the Motorola Digital Music Center, you can copy (rip) a song’s file from the CD onto your hard disk. The encoder then compresses the song into the MP3 format. Once the song is encoded, it can be played on your computer, any CD player that supports MP3, and most importantly, downloaded to your m250/m500 audio player.



## Appendix B – Menu Tree



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# Index

- AAC codec, 22
- About, 52
- AUD, 30, 53
- Backlight, 46
- Basic Operations, 24
- Bass, 56
- Battery, 15
  - indicator, 54
- Bitrate, 56
- Bookmarks, 37, 51
- Buttons and Controls, 25
- Codec, 56
- Contrast, 46
- Controls, 25
- Copy, 28
- Display, 45
- Earphones, 16
- Encoding, 27
- Equalizer, 39, 41, 42
- Firmware, 57
- FM Tuner, 34
- Forward, 26
- Gracenote, 18, 23, 67
- ID3 Tag, 21, 57
- iTunes, 7, 18, 22, 29
- Limited Warranty, 62
- Lithium Ion, 54
- Mini USB, 15
- Motorola Digital Music Center, 7, 18, 19, 20, 21, 27, 28, 57
- MP3, 7, 8, 21, 27, 53, 56, 57, 58, 62
- Play All, 31
- Play/Pause, 26
- Playback, 40
- Playlists, 21, 22
- Preset Mode, 36
- Resume, 44
- Reverse, 26
- Rip and Encode, 21, 22, 57
- Settings, 39
- Stop, 25
- Stopwatch, 38
- Store Preset, 35
- Synchronize, 21, 57
- Tags, 39, 50
- Technical Support, 53
- Time, 47
- Timecode, 44
- Track, 26, 27, 28, 30, 38, 39, 40, 44, 51, 53, 57
- Transfer, 20, 28
- Transferring tracks
  - iTunes, 29
- Treble, 58
- Tuner, 48
- USB, 16, 17
- Variable Bit Rate (VBR), 58
- VBR, 8, 53, 58
- Volume +/-, 25
- WMA, 7, 8, 21, 27, 53, 56, 57, 58



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